Paper No. 34

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANK T. HARTLEY
and JAMES H. WISE

Appeal No. 1997-4050
Application 08/535,317[1]

ON BRIEF

Before URYNOWICZ, BARRETT and KRASS, Administrative Patent Judges.

URYNOWICZ, Administrative Patent Judge.

Decision on Appeal

This appeal is from the final rejection of claims 1-28, 50-57 and 59.

The invention pertains to a transducer. Claims 1 and 9 are illustrative and read as follows:

[1] Application for patent filed September 27, 1995. According to appellants, the application is continuation of Application 08/106,448, filed August 16, 1993, now abandoned.

1. A microstructural transducer, comprising:
a microstructural platform;
a movable microstructural member;
a microstructural linkage elastically coupling said movable microstructural member to said microstructural platform;
measuring means for sensing displacement of said movable microstructural member relative to said platform;
first control means for inducing a first force field in response to said displacement; and
second control means for inducing a second force field near said movable member in accordance with a predetermined stimulus.

9. The transducer of Claim 1 wherein said second force field is an electrostatic field and said second control means comprises a conductive platen on said platform which is held at a voltage to generate said electrostatic field.

The references relied upon by the examiner as evidence of obviousness are:

Hulsing, II (Hulsing)	4,459,759	Jul. 17, 1984
Henrion et al. (Henrion)	5,134,881	Aug. 04, 1992

Claims 1, 3-9 and 12-27 stand rejected under 35 U.S.C. § 103 as unpatentable over Henrion.

Claims 2, 10, 11, 28, 50-57 and 59 stand rejected under 35 U.S.C. § 103 as unpatentable over Henrion in view of Hulsing.

The respective positions of the examiner and the appellants with regard to the propriety of these rejections are set forth in the final rejection (Paper No. 23) and the examiner’s answer (Paper No. 31), and the appellants’ brief (Paper No. 28).

Appellants' Invention

Figure 1 shows a transducer 10, useful as an accelerometer and the like, which includes a top platen 20 having cover 22 and a conductive surface 24 and a bottom platen 30 consisting of a cover 32, a conductive surface 34, and an insulating layer 35. A movable member 40 covered by underlying and overlying conductive layers 42
is supported on an elastically deformable spring structure 50. The spring structure is connected to the covers 22 and 32. A feedback position controller circuit 60 controls the voltage applied to the top cover conductive surface 24 so as to hold the movable member 40 at a selected equilibrium height between the top and bottom platens 20,30. Circuit 60 senses changes in capacitance between the conductive surfaces 24, 42 on the top platen 20 and movable member
40 to determine displacement of the movable member from its equilibrium height. It then changes the voltage applied to the cover conductive surface 24 so as to exert a compensating force tending to return the movable member 40 to its equilibrium height.

For a caging function, battery 100 is connected directly to

the bottom platen conductive surface 34 whenever the device is being shipped or handled. The battery voltage is sufficient to hold the movable member against the bottom platen 30 under a large range of accelerations. The thin insulating layer 35 prevents shorting between conductive surface 34 and lower conductive layer 42. The underlying conductive layer 42 on the member 40 ensures close proximity and high force between cover 32 and surface 34 during caging.

The Prior Art

With respect to Figure 13, Henrion discloses a transducer, useful as an accelerometer and the like, having a mass 36 supported from support 38 via springs 40. A voltage V_{cc} is applied between sense conducting areas 90' on plates of opposite support members 82, 84. A voltage V_{qq} is applied between force conducting areas 92'. Leads 96, connected to top and bottom sense conducting areas 90 of mass 36, are also connected to lead 110. Leads 94, connected to top and bottom force conducting areas 92' of mass 36, are further connected to lead 112.

The voltage appearing on lead 110 is proportional to the position of mass element 36 between the plates of support members 82, 84 because a sense electric field is created between sense conducting plates 90' by voltage V_{cc} and because sense conducting plates 90 of mass 36 are disposed in the path of that sense electric field. When the mass element moves toward the plate of top support member 82, the voltage on sense plates 90 and lead 110 approach the magnitude $V_{cc.}$ Conversely, when the mass element moves toward the plate of bottom support member 84, the voltage on sense plate 90 and lead 110 approaches zero or ground magnitude. Consequently, with the reference voltage $V_{cc}/2$ applied to differential amplifier 20, its output on lead 122 is a sense displacement signal proportional to the distance that mass element 36 has moved from a reference position halfway between supports 82, 84.

The voltage V_{qq} applied between force conducting areas of plates of top and bottom support members 82, 84 creates a force electric field across the force conducting areas 92 of mass 36. A negative feedback circuit including charge generator 130 produces an output on its output lead 112 in response to the output displacement signal from lead 128 to apply an amount and magnitude of electric

charge on force conducting areas 92 to move the mass toward its reference position. The force on mass 36 is proportional to the numerical product of the amount of charge deposited on plates 92 times the force electric field.

Hulsing discloses in Figure 2 a transducer having a rotor 60 suspended between magnetic structures 50, 55 by the attractive forces caused by interaction of the magnetic field set up by the stator magnets 44, 45 and the magnetic coils 52, 57. Coils 52, 57 are not
only used to control the axial position of the rotor 60 but are also energizable to deactivate the magnetic suspension to cage the rotor such that it is brought into contact with the stator 40.

Opinion

The Rejection under 35 U.S.C. §103 of

Claims 1, 3-9 and 12-27

Appellants traverse the rejection of the above claims over Henrion for the sole alleged reason that the reference does not

teach the second control means of the claims. It is argued that the second control means induces a second force field for uses other than responding to the sensed displacement of the mass, which is what Henrion does. It is asserted that only appellants have disclosed using the second force field to effect the caging, calibration, characterization and compensation of a transducer.

We are not persuaded by appellants' argument and will sustain the rejection of these claims. It is considered that appellants' argument is not commensurate in scope with the claim language in that none of the above functions, caging etc., are recited in the claims. Claim 1 recites a "second control means for inducing a second force field near said movable member in accordance with a predetermined stimulus." With respect to Henrion's Figure 13, force conducting areas 92', which have voltage V_{qq} applied thereto, and force conducting areas 92, which have the output of generator 130 applied thereto, are a second control means for inducing a second force field near movable member 36 (col. 13, line 58 to col. 14, line 4). The voltage amplitudes are a stimulus which is predetermined by a user and the electric field produced thereby is a second force field[2].

[2] In the alternative, plates 92' alone can be considered the second control means of claim 1.

The Rejection under 35 U.S.C. § 103 of

Claims 2, 10, 11, 28, 50-57 and 59

As to this rejection, appellants acknowledge at page 10 of the brief that Hulsing teaches a transducer having a control means to apply a caging force when the transducer is not in use (col. 5, lines 49-52). It is argued that Hulsing is devoid of any teaching of a second control means to apply a second force field for the purpose of caging, calibrating, characterizing, and or effecting compensation in association with the operation of the transducer.

The examiner's position is to the effect that in view of Hulsing, it would have been obvious to secure the mass 36 of Henrion (Figure 13) by caging. The examiner acknowledges that Hulsing cages by way of a magnetic field, not an electric field, but argues it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize an electric field because it was well known in the art to use either an electric or magnetic field to manipulate the relationship between two objects.

We are not persuaded by appellants' argument and will sustain the rejection of claims 2, 10, 11, 28, 50-57 and 59. Appellants

have not argued there is no motivation to combine the caging teaching of Hulsing with the teachings of Henrion, and we agree with the examiner that one would have been motivated to combine the caging teaching of Hulsing with Henrion "to reduce the possibility of transducer damage during inactive states", as during transportation of Henrion's transducer. Appellants' argument that Hulsing is devoid of a second control means to apply a second force field for the purpose of caging, etc. is unpersuasive because Henrion discloses the first control means of the claims and Hulsing discloses a second control means 52, 57 which produces a magnetic force field which cages a movable member, rotor 60. To the extent that appellants argue that Hulsing does not disclose two control means, the argument is unpersuasive. It is the combined teachings of the prior art that must be considered. Non-obviousness cannot be established by attacking references individually where, as here, the rejection is based upon the teachings of a combination of references. In re Merck & Co., 800 F.2d 1091, 1097, 231 USPQ 375, 380 (Fed. Cir. 1986).

Lastly, appellants argue that the combination of Henrion and Hulsing does not teach an electrostatic force field for caging.

Only claims 9 and 10 require that the second force field is an electrostatic field. We agree with the examiner that one of ordinary skill in the art recognized at the time the invention was made that

electrostatic and magnetic force fields could be used to manipulate the relationship between two objects. This is evidenced by Henrion, which uses electrostatic fields, and Hulsing, which utilizes magnetic fields. Because Henrion's apparatus utilizes electrostatic fields produced by voltage energized plates such as 90' in Figure 13, one of ordinary skill in the art desiring to add a caging function to the apparatus to hold mass 36 in a fixed position to avoid damage to the apparatus would have utilized such voltage energized plates because such structures are already present in the Henrion apparatus. To utilize a magnetic force field in Henrion would have involved adding magnetic field producing coils such as 52, 57 taught by Hulsing, significantly modifying Henrion's structure.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED

STANLEY M. URYNOWICZ, JR. Administrative Patent Judge	)	
ERROL A. KRASS Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES

)
LEE E. BARRETT)
Administrative Patent Judge)

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